

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for isolating failed routing resources on a programmable integrated circuit, the method comprising:

receiving a first plurality of failed test patterns, wherein a test pattern includes program bits that define how routing resources on the programmable integrated circuit are connected to form a test path, wherein a test pattern is designated as failing when a result from a test path is erroneous, wherein the result of the failed test path is created by applying one or more test values to the failed test path;

~~receiving a second plurality of failed test patterns resulting from applying one or more test values to tests paths on one or more other programmable integrated circuits, wherein the other programmable circuits have a same architecture as the programmable integrated circuit;~~

identifying a subset of the routing resources on the programmable integrated circuit based ~~only on the first plurality of failed test patterns that have failed and on the second plurality of failed test patterns~~, wherein the subset comprises one or more routing resources that respectively occur in the most failed test paths; and

generating new test patterns including program bits that define new test paths for testing the subset of the routing resources, wherein each of the new test paths includes:

the first routing resource; and
a combination, not included in the other new test paths, of fan-in and fan-out resources that are programmably connectable to the first routing resource,
wherein the new test paths test every combination of fan-in and fan-out resources that are programmably connectable to the first routing resource.

2. (Previously Presented) The method according to claim 1 further comprising:

running the new test patterns using a test system to isolate routing resources among the subset of the routing resources that caused the erroneous results in the failed test patterns.

3. (Previously Presented) The method according to claim 1 wherein generating the new test patterns includes program bits that define new test paths for testing every routing resource of the subset; and

wherein for each routing resource of the subset, the new test paths route through every combination of fan-in resources and fan-out resources that are programmably connectable to that routing resource of the subset.

4. (Original) The method according to claim 1 wherein generating the new test patterns for the subset of the routing resources further comprises:

generating new test patterns for test paths that route through clock and clear signal routing resources.

5. (Original) The method according to claim 1 wherein each of the failed test paths and the new test paths connect a control point to an observation point on the programmable integrated circuit.

6. (Original) The method according to claim 1 wherein the routing resources have more than 1000 times as many routing resources as the subset of routing resources.

7. (Original) The method according to claim 5 further comprising:
receiving a test log file that indicates the observation points for the failed test paths.

8. (Original) The method according to claim 1 wherein identifying the subset of the routing resources that occur most frequently in the failed test paths further comprises:

extracting the routing resources that are connected along each of the failed test paths using a connectivity graph.

9. (Currently Amended) A computer program product encoded on a computer readable medium for directing a processor to isolate failed routing resources on a programmable integrated circuit, the computer readable medium comprising:

code for receiving a plurality of failed test patterns generating erroneous results when test values are applied to a set of failed test paths, wherein a test pattern includes program bits that define how routing resources on the programmable integrated circuit are connected to form a test path;

~~code for receiving a second plurality of failed test patterns resulting from applying one or more test values to tests paths on one or more other programmable integrated circuits, wherein the other programmable circuits have a same architecture as the programmable integrated circuit;~~

code for identifying a subset of the routing resources on the programmable integrated circuit based only on the first plurality of failed test patterns that have failed and on the second plurality of failed test patterns, wherein the subset comprises one or more routing resources that respectively occur in the most failed test paths; and

code for generating new test patterns including program bits that define new test paths for testing the subset of the routing resources, wherein each of the new test paths includes:

the first routing resource; and
a combination, not included in the other new test paths, of fan-in and fan-out resources that are programmably connectable to the first routing resource,

wherein the new test paths test every combination of fan-in and fan-out resources that are programmably connectable to the first routing resource.

10. (Original) The computer program product of claim 9 wherein the code for receiving and identifying further comprises:

code for receiving a test log file that indicates observation points for the failed test paths.

11. (Original) The computer program product of claim 9 wherein the code for generating further comprises:

code for generating new test patterns for test paths that route through clock and clear signal routing resources.

12. (Original) The computer program product of claim 9 further comprising:
code for testing the new test patterns to isolate routing resources among the subset that caused the erroneous results in the failed test patterns.

13. (Original) The computer program product of claim 9 wherein the code for generating further comprises:

code for generating new test patterns that route through every combination of fan-in resources and fan-out resources that are programmably connectable to each of the subset of the routing resources.

14. (Original) The computer program product of claim 9 wherein the routing resources have more than 10,000 times as many routing resources as the subset of the routing resources.

15. (Currently Amended) A computer system for isolating failed routing resources on a programmable integrated circuit, the computer system comprising a computer readable medium for directing a processor to isolate failed routing resources on a programmable integrated circuit, the computer readable medium comprising:

code for a statistical failure isolation (SFI) tool, wherein the SFI tool:

(a) receives a file including a plurality of failed test patterns that generated erroneous results when test values were applied to a set of failed test paths, wherein a test pattern includes program bits that define how routing resources on the programmable integrated circuit are connected to form a test path;

(b) determines routing resources along each failed test path;

(c) calculates a total number of occurrences of each resource in the failed test paths received in the file, at least one resource occurring in two failed test paths; and
(d) identifies a subset of the routing resources based only on the test patterns that have failed, wherein the subset comprises one or more resources having the highest number of occurrences; and

code for an adaptive failure isolation (AFI) tool that subsequent to completion of (b)-(d) generates new test patterns including program bits that define new test paths for testing the subset of the routing resources, wherein each of the new test paths includes:

the first routing resource; and
a combination, not included in the other new test paths, of fan-in and fan-out resources that are programmably connectable to the first routing resource,

wherein the new test paths test every combination of fan-in and fan-out resources that are programmably connectable to the first routing resource.

16. (Original) The computer system according to claim 15 wherein the SFI tool also receives a test log file that indicates observation points for the failed test paths.

17. (Original) The computer system according to claim 15 further comprising:

a test system that tests the new test patterns to isolate routing resources among the subset that caused the erroneous results in the failed test patterns.

18. (Canceled)

19. (Original) The computer system according to claim 15 wherein the routing resources have more than 1000 times as many routing resources as the subset of routing resources.

20. (Original) The computer system according to claim 15 wherein the SFI tool extracts the routing resources that are connected along each of the failed test paths using a connectivity graph.

21. (Previously Presented) The method of claim 1, wherein each of the new test paths is used to determine whether the resources of the subset have actually failed.

22. (Previously Presented) The method of claim 1, wherein the erroneous result of a failed test path is an output value of the failed test path that does not equal an expected value.

23.-25. (Canceled)

26. (New) The method of claim 1, further comprising:
receiving a second plurality of failed test patterns resulting from applying one or more test values to tests paths on one or more other programmable integrated circuits that are not integrated with the programmable integrated circuit, wherein the other programmable circuits have a same architecture as the programmable integrated circuit, wherein identifying a subset of the routing resources on the programmable integrated circuit based only on test patterns that have failed includes using the first plurality of failed test patterns and the second plurality of failed test patterns.

27. (New) The computer program product of claim 9, wherein the code for generating further comprises:

code for receiving a second plurality of failed test patterns resulting from applying one or more test values to tests paths on one or more other programmable integrated circuits that are not integrated with the programmable integrated circuit, wherein the other programmable circuits have a same architecture as the programmable integrated circuit, wherein identifying a subset of the routing resources on the programmable integrated circuit based only on test patterns that have failed includes using the first plurality of failed test patterns and the second plurality of failed test patterns.

28. (New) The computer system according to claim 15, wherein the SFI tool also receives a second plurality of failed test patterns resulting from applying one or more test values to tests paths on one or more other programmable integrated circuits that are not

integrated with the programmable integrated circuit, wherein the other programmable circuits have a same architecture as the programmable integrated circuit, and wherein the SFI tool is configured to use the plurality of failed test patterns and the second plurality of failed test patterns to identify the subset of the routing resources based only on test patterns that have failed includes.